Development of Improved Vegetative Propagation Techniques for Selected Tropical Cut Flowers

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Introduction

Many commercially important ornamental plants are propagated vegetatively. The discovery of root inducing chemicals and the development of mist propagation and micropropagation techniques has greatly enhanced vegetative propagation procedures. Different species, however, differ in their responses to the various propagation techniques. Successful propagation requires knowledge of the physiology of the plants as well as environmental and chemical manipulations. For some ornamental species, conventional vegetative propagation methods are too slow for large- scale production to meet increasing demand. The overall objective of the study is to develop suitable techniques for cost-efficient mass propagation of planting materials for selected ornamental species with good commercial potential. The study focused on the development of protocols for micropropagation of *Polianthes tuberosa*, a herbaceous perennial grown commercially for its fragrant cut flowers and essential oil. Little information is available on tissue culture of tuberose (Muralidhar and Mehta, 1986) and results, in most cases, have been inconsistent.

Materials and Methods

Various concentrations of NAA in combination with either BAP or Kinetin were used to initiate callus and shoot formation from rhizomes and bulb segments of *Polianthes tuberosa* cultured in full strength MS media. The effect of different levels of 2,4-D on callus initiation was also investigated. The rooting hormones IBA and NAA were tested to determine their effectiveness in inducing in-vitro rooting of the shoots produced in the first part of the experiment. Shoots which were successfully rooted were transferred into pots containing conventional growing media of soil peat sand (3:2:1, v/v) or sand: vermiculite (1:1, v/v) for initial observation of plantlets performance under *ex-vitro* conditions.

Results and Discussion

Initiation of callus decreased with increasing concentration of NAA. The highest percentage of callus formation occurred at 1.0 mg/L NAA. NAA has also been previously found to successfully induce callus initiation in several other plant species. Treatment with low levels of 2,4-D (0.25 – 1.0 mg/L) also induced callus formation. The percentage of explants producing shoots was very high (90%) regardless of whether NAA, BAP or Kinetin was used or not. However, the number of shoots formed per explants was highest when 0.1 mg/L NAA was used in combination with either 1.0 mg/L BAP or 0.5 mg/L Kinetin. In vitro rooting of the shoots was achieved using 1.0 mg/L IBA which produced the best rooting performance in terms of rooting percentage, and root quality. Rooted plantlets performed reasonably well under ex-vitro condition where 75% of the plantlets survived after six weeks of transfer.

Conclusions

Both callus and shoot formation can be obtained from bulb segments of P. *tuberosa* cultured in MS media supplemented with the growth regulators NAA, BAP or Kinetin in the appropriate concentration, while in-vitro rooting of the shoots can be induced using IBA.

Benefits from the study

In vitro plant regeneration protocol for *Polianthes tuberosa* was established. The protocol is not only useful in developing a procedure for the micropropagation of the species but is also a prerequisite for any attempt at cultivars improvement through genetic transformation.

Literature cited in the text

Muralidhar, C.E. and Mehta, A.R.. 1986. Plant regeneration from bulb segments of tuberose. *HortScience* 21: 859-860.

Project Publications in Refereed Journals

None.

Project Publications in Conference Proceedings

Asiah A.M., Azmi, A.R.,.Tan, H.C., Lim, Y.S. and Abdullah, T.L.. 2001. In Vitro plantlet regeneration of Polianthes Tuberosa. In: Proceedings of Bengkel Penyelidikan Fakulti Pertanian. Pp. 33-34.

Graduate Research

None.

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